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## Path creation in Nordic energy and road transport systems

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We compare path-creation processes in Nordic energy and transport processes and discuss how new paths can be created, sub-optimal solutions be avoided and existing barriers been tackled.

We address following research questions:

1. How do the Nordic countries develop new paths for sustainable road transport?
2. How do these countries address barriers to the new paths and strengthen the new paths?

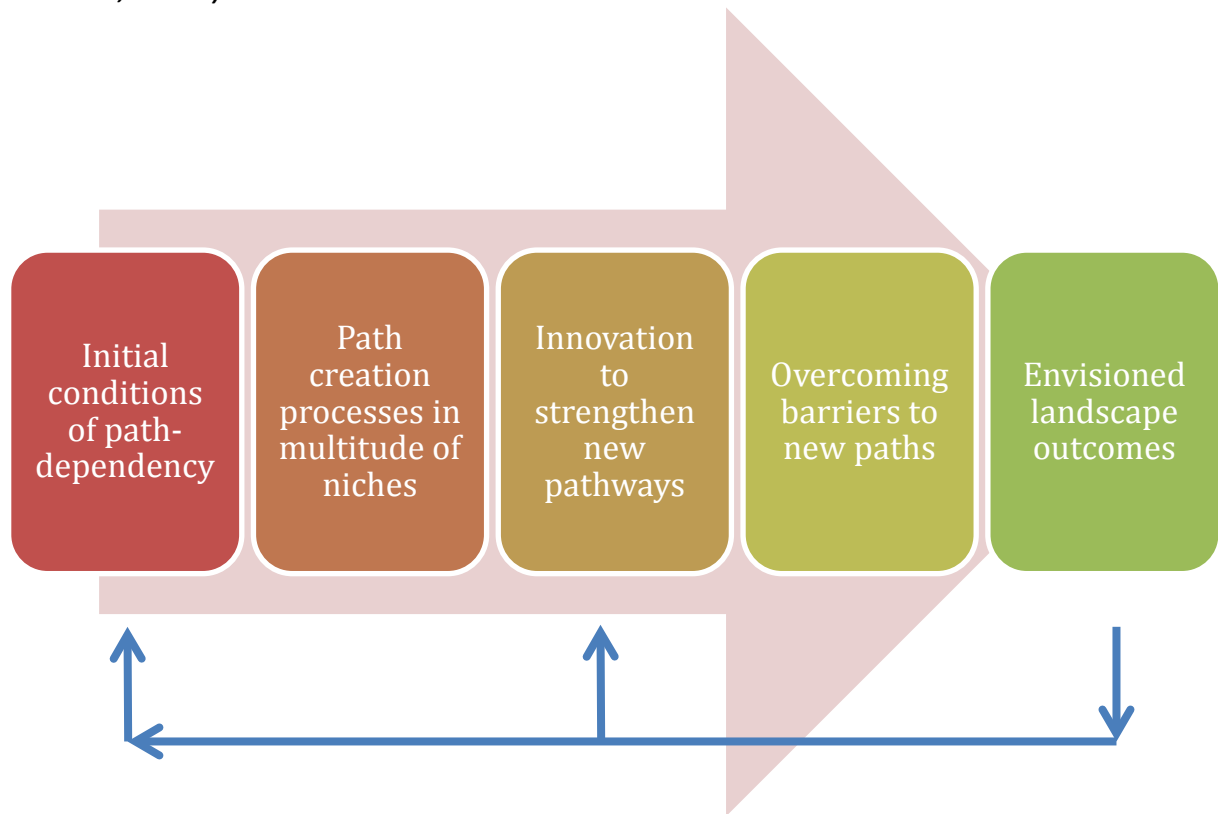
Simmie has proposed a hybrid socio-economic theory of new path creation, distinguishing between the initial conditions of path-dependency, path creation processes by different agents in a multitude of niches, new path establishment processes to achieve critical mass and to overcome barriers to new path creation, and landscape change outcomes (2012:760ff).

We apply Simmie's model of new path creation (see figure) and use the results of selected case studies as examples for path-creation processes. We present results on e-mobility in Denmark (Borup, 2013), advanced biofuels in Finland (Wessberg & Eerola, 2013), hydrogen and fuel cell electrical vehicles in Norway (Scordato & Klitkou, 2014), and advanced bioethanol in Sweden (Hansen & Coenen, 2013).

We ground this empirical paper in the multi-level perspective on transition processes. To overcome incumbent socio-technical regimes requires the establishment of new and innovative niches. Here the concept of path creation has gained special relevance (Kemp & Rip, 2001). However, is it possible to escape lock-ins and path-dependency for these new paths? Is it possible to gain from technological and institutional lock-in mechanisms in the development of new paths?

There are four issues which have to be addressed: (1) shift from existing path dependency in niches; (2) avoiding new, sub-optimal lock-ins; (3) path-creation has to be supported by system innovations; and (4) the concept of 'increasing returns' for analysing energy systems and road transport systems.

*Figure: Hybrid socio-economic theory of new path creation (adapted from Simmie, 2012)*



**Keywords:** Path creation, Nordic energy and transport system, advanced biofuels, e-mobility, hydrogen and fuel cell electrical vehicles